

APPENDIX A

COST ESTIMATES FOR IMPLEMENTATION OF REMEDIAL ALTERNATIVES

**Table A-1. Summary of Remedial Alternative Costs
Impact Area MRA, Track 3 Impact Area Feasibility Study,
Former Fort Ord, California**

REMEDIAL ALTERNATIVE				Cost Breakdown
<u>LONG TERM MANAGEMENT MEASURES</u>	\$22,000	\$431,000	\$453,000	Table A-2
<u>ALTERNATIVE 1</u> NO FURTHER ACTION	<i>No costs</i>	<i>No costs</i>	<i>No costs</i>	--
<u>ALTERNATIVE 2</u> TECHNOLOGY-AIDED SURFACE MEC REMEDIATION AND LAND USE CONTROLS	\$8,878,000	\$80,019,000	\$88,897,000	Table A-3
<u>ALTERNATIVE 3</u> SUBSURFACE MEC REMEDIATION AND LAND USE CONTROLS	\$23,407,000	\$399,759,000	\$423,166,000	Table A-4
<u>ALTERNATIVE 4</u> TECHNOLOGY-AIDED SURFACE MEC REMEDIATION (100%), WITH SUBSURFACE MEC REMEDIATION IN SELECTED AREAS (10%), AND LAND USE CONTROLS	\$15,379,000	\$123,032,000	\$138,411,000	Table A-5

The following costs are assumed to be addressed under separate programs: (1) Administrative Record management (after submission of documents); (2) Community Relations; (3) Habitat Monitoring and Restoration, and other remedial alternative-specific costs as noted in Tables A-2 through A-5.

Checked MS

Approved BCW

**Table A-2. Long Term Management Measures Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California**

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS (a)				
File Initial Property Transfer Document	1	Entire MRA	\$10,000	\$10,000
Modify or Remove Land Use Controls in Property Transfer Document	1	Entire MRA	\$10,000	\$10,000
Subtotal Capital Costs				\$20,000
Capital Cost Contingency	10%	of Capital Costs		\$2,000
TOTAL CAPITAL COSTS				\$22,000
ANNUAL COSTS (a)				
ANNUAL LTMM COSTS				
Annual Monitoring	1	Entire MRA	\$10,000	\$10,000
Annualized 5-Year Review Reporting Cost	1	Entire MRA	\$10,000	\$10,000
Subtotal Annual Costs				\$20,000
Annual Cost Contingency	10%	of Annual Costs		\$2,000
TOTAL ANNUAL COSTS				\$22,000
TOTAL 30 YEAR ANNUAL COSTS (b)				\$431,000
TOTAL REMEDIAL ALTERNATIVE COST				\$453,000

DEFINITIONS

LTMM = Long Term Management Measure

NPV = Net Present Value

ASSUMPTIONS

These costs are for comparison purposes only, have an accuracy of +50/-30%, and are rounded to the nearest \$1,000.

The following costs are assumed to be addressed under separate programs: (1) Administrative Record management (after submission of documents); (2) Community Relations; (3) Habitat Monitoring and Restoration.

Many design variables and necessary prefield activities have not been established.

Cost estimates will be refined after the field preparation/design is completed.

FOOTNOTES

(a) Unit Costs based on recent Fort Ord specific data provided by Army/USACE for Impact Area MRA or similar site.

(b) USACE/EPA provide guidelines in OSWER Directive 9355.0-75 for estimating remedial alternative costs in Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Appendix C, President's Federal Office of Management and Budget (OMB, January 2007) (www.whitehouse.gov), (January 2007; updated yearly). The guidelines for federal projects were applied for estimating the NPV based on annual costs for project durations of 30 years using a rate of return of 3%.

Checked MS
Approved BCW

**Table A-3. Alternative 2 --Technology-Aided Surface MEC Remediation and Land Use Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California**

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [YEAR 1] (a)				
PRESCRIBED BURNING [YEAR 1] (b)				
Planning, Tech Support, Meteorological Profiling, Set-Up	800	acres	\$535	\$428,000
Install Primary Fuelbreak	800	acres	\$311	\$248,800
Conduct Prescribed Burn	800	acres	\$1,250	\$1,000,000
Community Relations	800	acres	\$360	\$288,000
Air Sampling & Monitoring	800	acres	\$320	\$256,000
Security	4	weeks	\$15,000	\$60,000
Subtotal Costs				\$2,281,000
TECHNOLOGY-AIDED SURFACE MEC REMEDIATION & DIGITAL MAPPING RECORD [YEAR 1] (c)				
Install Temporary Perimeter Security Fencing	20,000	ft	\$4	\$80,000
Survey (Boundary & Grid)	800	acres	\$75	\$60,000
Post Burn Vegetation Removal	800	acres	\$1,700	\$1,360,000
Digital Survey of Anomalies	800	acres	\$2,900	\$2,320,000
Detonation & Engineering Controls	800	acres	\$275	\$220,000
Quality Control	800	acres	\$20	\$16,000
Range Residue Removal	800	acres	\$80	\$64,000
Surface Removal	800	acres	\$2,050	\$1,640,000
Subtotal Costs				\$5,760,000
Reporting	1	lump sum	\$30,000	\$30,000
Subtotal Capital Costs				\$8,071,000
Capital Cost Contingency	10%	of Cost Subtotal		\$807,100
TOTAL CAPITAL COST [YEAR 1]				\$8,878,000
ANNUAL COSTS				
PRESCRIBED BURNING, MEC REMEDIATION, DIGITAL MAPPING RECORD [YEARS 2-8]				
Prescribed Burning / MEC Remediation Yearly Cost (from Year 1)	1	lump sum	\$8,878,000	\$8,878,000
Subtotal with Annual Cost Contingency of 5%				\$9,322,000
HABITAT MANAGEMENT [YEARS 2-13] (d)				
Maintain roads / erosion control	1	lump sum	\$37,500	\$37,500
Maintain fuelbreaks	1	lump sum	\$120,000	\$120,000
Invasive weed control in burned areas	1	lump sum	\$233,000	\$233,000
Annual plants monitoring & reporting in burned areas	1	lump sum	\$24,000	\$24,000
Chaparral monitoring & reporting in burned areas	1	lump sum	\$35,500	\$35,500
Subtotal with Annual Cost Contingency of 5%				\$473,000
LAND USE CONTROLS [YEARS 1-30] (e)				
Access restrictions Law Enforcement Ranger	1	lump sum	\$42,000	\$42,000
Maintain perimeter fence & signs	1	lump sum	\$30,000	\$30,000
MEC Recognition & Safety Training	16	week	\$300	\$4,800
Construction Monitoring / UXO-Qualified Personnel Support	260	day	\$2,600	\$676,000
Fire suppression helicopter (post-remediation HCP burns) (Years 20-30)	1	lump sum	\$34,000	\$34,000
Subtotal with Annual Cost Contingency of 5%				\$826,000
TOTAL 30 YEAR NPV COSTS (f)				\$80,019,000
TOTAL REMEDIAL ALTERNATIVE COST				\$88,897,000

**Table A-3. Alternative 2 –Technology-Aided Surface MEC Remediation and Land Use Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California**

DEFINITIONS

MEC = Munitions and Explosives of Concern / GIS = Geographical Information System / NPV = Net Present Value

ASSUMPTIONS

These costs are for comparison purposes only, have an accuracy of +50/-30%, and are rounded to the nearest \$1,000.

The following costs are assumed to be addressed under separate programs: (1) Administrative Record management (after submission of documents); (2) Community Relations; (3) Habitat Monitoring and Restoration.

Many design variables and necessary prefield activities have not been established.

Cost estimates will be refined after the field preparation/design is completed.

FOOTNOTES

(a) This alternative assumes Technology-Aided Surface MEC Removal throughout the Impact Area MRA. It is assumed prescribed burning (followed by MEC remedial action) would be implemented using a phased approach of conducting prescribed burning and MEC removals of approximately 800 acres of the 6,560-acre Impact Area MRA per year (2 separate mobilizations and burns at 400-acres each, for a period of approximately 8 years) in accordance with the HMP. Therefore, a Technology-Aided Surface MEC Removal would be conducted on 800 acres of the Impact Area MRA each year for 8 years. Reporting includes preparation of Annual Site Specific Work Plans and After Action Reports for each phase of prescribed burning and MEC removal.

(b) Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site, and assumes 2 prescribed burns / mobilizations per year. Potential costs associated with community relations and relocation during prescribed burns are not included.

(c) Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for Impact Area or similar site as follows: Unit pricing includes all management and GIS/Database support operations. The scope of work includes establishing site boundary and 1000'x1000' grids. Post-removal digital mapping of anomalies includes 5% manual methods and 95% towed-array method with an average production rate of 2 acres per team day. Unit pricing can be highly variable depending on site conditions. The unit costs are averaged within the range of typical production rates. Potential costs associated with procuring temporary explosive storage bunkers are not included.

(d) Annualized Unit Costs for maintaining roads, fuelbreaks, and performing invasive weed control based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site as follows: [1] Existing roads would be maintained, including erosion control. [2] Existing fuelbreaks would be maintained. [3] Invasive weed control. Costs assumed by Army until 5 years after property transfer (assumed to be 13 years (8 years to complete MEC remedial action and 5 additional years)). Annualized Unit Costs for performing HMP species monitoring are based on recent Fort Ord specific data provided by the Army/USACE and their contractor(s) for the Impact Area or similar site as follows for: [1] HMP annual plants assumed to be monitored during 3 events in the first 5 years & [2] HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data management/evaluation, preparation of reports. Each 800-acre area would be managed in this manner.

(e) Annualized Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for Impact Area or similar site. Costs assumed by Army, estimated for a total of 30 years under CERCLA FS Cost Guidance (EPA, 1988): [1] Law Enforcement Ranger personnel (assumes one-third of a full time-equivalent of a law enforcement ranger would be employed during reuse of the Impact Area MRA) enforcing access restrictions along the perimeter of the fenced Impact Area MRA. [2] 4-strand barbed wire fence w/concertina wire in some portions & signs would be maintained, and vegetation would be mowed along the fence line. [3] Construction Monitoring / UXO-qualified personnel support assumes full time two-person qualified MEC personnel team visually observing construction activities or providing support 24 weeks per year. [4] MEC Recognition & Safety Training assumes weekly training and/or refresher training. Costs assumed by Army, assumed to begin after 20 years of vegetation regrowth in approx. 2028; therefore, costs are estimated for 10 years of the total 30 years under CERCLA FS Cost Guidance (EPA, 1988): [5] T₁ 100-acre per year HCP burns, where ground-based methods would be unsafe due to the possible presence of subsurface MEC.

(f) USACE/EPA provide guidelines in OSWER Directive 9355.0-75 for estimating remedial alternative costs in Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Appendix C, President's Federal Office of Management and Budget (OMB, January 2007) (www.whitehouse.gov). (January 2007; updated yearly). The guidelines for federal projects were applied for estimating the NPV based on annual costs for project durations under 10 years using a rate of return of 2.7%; 10 to 20 years using a rate of 2.8%; 20 to 30 years using a rate of 3%.

Checked: MS

Approved: BLW

Table A-4. Alternative 3 – Subsurface MEC Remediation and Land Use Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [YEAR 1] (a)				
PRESCRIBED BURNING [YEAR 1] (b)				
Planning, Tech Support, Meteorological Profiling, Set-Up	300	acres	\$535	\$160,500
Install Primary Fuelbreak	300	acres	\$311	\$93,300
Conduct Prescribed Burn	300	acres	\$1,250	\$375,000
Community Relations	300	acres	\$360	\$108,000
Air Sampling & Monitoring	300	acres	\$280	\$84,000
Security	3	weeks	\$15,000	\$45,000
Subtotal Capital Costs				\$866,000
SUBSURFACE MEC REMEDIATION & DIGITAL MAPPING RECORD [YEAR 1] (c)				
Install Temporary Perimeter Security Fencing	15,000	ft	\$4	\$60,000
Survey (Boundary & Grid)	300	acres	\$850	\$255,000
Post Burn Vegetation Removal	300	acres	\$1,700	\$510,000
Digital Survey of Anomalies	300	acres	\$2,900	\$870,000
Digital Survey to Reacquire Anomalies	300	acres	\$900	\$270,000
Detonation & Engineering Controls	300	acres	\$800	\$240,000
Excavation / Sifting	15	acres	\$115,000	\$1,725,000
Quality Control	300	acres	\$1,000	\$300,000
Range Residue Removal	300	acres	\$1,100	\$330,000
Analog Removal	300	acres	\$39,800	\$11,940,000
Post-Analog Digital Survey Removal	300	acres	\$10,600	\$3,180,000
Surface Removal	300	acres	\$2,050	\$615,000
Site Erosion Control / Restoration	300	acres	\$260	\$78,000
Subtotal Costs				\$20,373,000
Reporting	1	lump sum	\$40,000	\$40,000
Subtotal Capital Costs				\$21,279,000
Capital Cost Contingency	10%	of Cost Subtotal		\$2,128,000
TOTAL CAPITAL COSTS [YEAR 1]				\$23,407,000
ANNUAL COSTS				
PRESCRIBED BURNING, MEC REMEDIATION & DIGITAL MAPPING RECORD [YEARS 2-22]				
Prescribed Burning / MEC Remediation Yearly Cost (See Year 1)	1	lump sum	\$23,407,000	\$23,407,000
Subtotal with Annual Cost Contingency of 5%				\$24,577,000
HABITAT MANAGEMENT [YEARS 2-27] (d)				
Maintain roads / erosion control	1	lump sum	\$37,500	\$37,500
Maintain fuelbreaks	1	lump sum	\$120,000	\$120,000
Invasive weed control in burned areas	1	lump sum	\$87,500	\$87,500
Annual plants monitoring & reporting in burned areas	1	lump sum	\$36,000	\$36,000
Chaparral monitoring & reporting in burned areas	1	lump sum	\$53,000	\$53,000
Subtotal with Annual Cost Contingency of 5%				\$351,000
LAND USE CONTROLS [YEARS 1-30] (e)				
Access restrictions Law Enforcement Ranger	1	lump sum	\$42,000	\$42,000
Maintain perimeter fence & signs (Years 1-22)	1	lump sum	\$30,000	\$30,000
MEC Recognition & Safety Training	16	week	\$300	\$4,800
Construction Monitoring / UXO-Qualified Personnel Support	260	day	\$2,600	\$676,000
Subtotal with Annual Cost Contingency of 5%				\$790,000
TOTAL 30 YEAR NPV ANNUAL COSTS (f)				\$399,759,000
TOTAL REMEDIAL ALTERNATIVE COST				\$423,166,000

Table A-4. Alternative 3 -- Subsurface MEC Remediation and Land Use Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California

DEFINITIONS

MEC = Munitions and Explosives of Concern
GIS = Geographical Information System
NPV = Net Present Value

ASSUMPTIONS

These costs are for comparison purposes only, have an accuracy of +50/-30%, and are rounded to the nearest \$1,000.

The following costs are assumed to be addressed under separate programs: (1) Administrative Record management (after submission of documents); (2) Community Relations; (3) Habitat Monitoring and Restoration.

Many design variables and necessary prefield activities have not been established.

Cost estimates will be refined after the field preparation/design is completed.

FOOTNOTES

(a) This alternative assumes prescribed burning, followed by Subsurface MEC Removal would be implemented using a phased approach of conducting prescribed burning and MEC removals of approximately 300-acres of the 6,560-acre Impact Area MRA per year for a period of approximately 22 years. Therefore, a Subsurface MEC Removal would be conducted on 300 acres of the Impact Area MRA each year for 22 years. Reporting includes preparation of Annual Site Specific Work Plans and After Action Reports for each phase of prescribed burning and MEC removal.

(b) Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site, and assumes 1 prescribed burn / mobilization per year. Potential costs associated with community relations and relocation during prescribed burns are not included.

(c) Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for Impact Area or similar site as follows: Unit pricing includes all management and GIS/Database support operations. The scope of work includes establishing site boundary and 100'x100' grids. Vegetation removal includes approximately 20% manual removal methods and 80% mechanical removal methods. Production rates for vegetation removal range from approximately 1 to 8 acres per team day with an overall rate of 2.6 acres per team day. Digital mapping of anomalies includes 5% manual methods and 95% towed-array method with an average production rate of 2 acres per team day. Site erosion control/restoration is limited to straw and crimping. Unit pricing can be highly variable depending on site conditions. The unit costs are averaged within a range of production rates and costs based on site experience. Potential costs associated with procuring temporary explosive storage bunkers are not included. For the entire project for purposes of preparing cost estimates only, assumes approximately 320 acres would require excavation and sifting (15 acres per year for up to 22 years) to include: (1) s (4) habitat restoration (restoration costs were annualized assuming a cost of \$45,000 per acre based on recent Fort Ord specific data provided by the Army/USACE and their contractor(s) for the Impact Area or similar site).

(d) Annualized Unit Costs for maintaining roads, fuelbreaks, and performing invasive weed control based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site as follows: [1] Existing roads would be maintained, including erosion control. [2] Existing fuelbreaks would be maintained. [3] Invasive weed control. Costs assumed by Army until 5 years after property transfer (assumed to be 27 years (22 years to complete MEC remedial action and 5 additional years)). Annualized Unit Costs for performing HMP species monitoring are based on recent Fort Ord specific data provided by the Army/USACE and their contractor(s) for the Impact Area or similar site as follows for: [1] HMP annual plants assumed to be monitored during 3 events in the first 5 years & [2] HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data management/evaluation, preparation of reports. Each 300-acre area would be managed in this manner.

(e) Annualized Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for Impact Area or similar site. Costs assumed by Army as follows, estimated for a total of 30 years under CERCLA FS Cost Guidance (EPA, 1988) for [1], [3], and [4]; costs assumed by Army for [2] a total of 22 years: [1] Law Enforcement Ranger personnel (assumes one-third of a full time-equivalent of a law enforcement ranger would be employed during reuse of the Impact Area MRA) enforcing access restrictions along the perimeter of the fenced Impact Area MRA. [2] 4-strand barbed wire fence w/concertina wire in some portions & signs would be maintained, and vegetation would be mowed along the fence line. [3] Construction Monitoring / UXO-qualified personnel support assumes full time two-person qualified MEC personnel team visually observing construction activities or providing escort 24 weeks per year. [4] MEC Recognition & Safety Training assumes weekly training and/or refresher training.

(f) USACE/EPA provide guidelines in OSWER Directive 9355.0-75 for estimating remedial alternative costs in Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Appendix C, President's Federal Office of Management and Budget (OMB, January 2007) (www.whitehouse.gov). (January 2007; updated yearly). The guidelines for federal projects were applied for estimating the NPV based on annual costs for project durations under 10 years using a rate of return of 2.7%; 10 to 20 years using a rate of 2.8%; 20 to 30 years using a rate of 3%.

Checked: MS

Approved: BUW

Table A-5. Alternative 4 – Technology-Aided Surface MEC Remediation, With Subsurface MEC Remediation in Selected Areas, and Land Use

**Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California**

ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
CAPITAL COSTS [YEAR 1] (a)				
PRESCRIBED BURNING [YEAR 1] (b)				
Planning, Tech Support, Meteorological Profiling, Set-Up	800	acres	\$535	\$428,000
Install Primary Fuelbreak	800	acres	\$311	\$248,800
Conduct Prescribed Burn	800	acres	\$1,250	\$1,000,000
Community Relations	800	acres	\$360	\$288,000
Air Sampling & Monitoring	800	acres	\$320	\$256,000
Security	4	weeks	\$15,000	\$60,000
Subtotal Costs				\$2,281,000
TECHNOLOGY-AIDED SURFACE MEC REMEDIATION & DIGITAL MAPPING RECORD [YEAR 1] (c)				
Install Temporary Perimeter Security Fencing	20,000	ft	\$4	\$80,000
Survey (Boundary & Grid)	800	acres	\$75	\$60,000
Post Burn Vegetation Removal	800	acres	\$1,700	\$1,360,000
Digital Survey of Anomalies	800	acres	\$2,900	\$2,320,000
Detonation & Engineering Controls	800	acres	\$275	\$220,000
Quality Control	800	acres	\$20	\$16,000
Range Residue Removal	800	acres	\$80	\$64,000
Surface Removal	800	acres	\$2,050	\$1,640,000
Subtotal Costs				\$5,760,000
SUBSURFACE MEC REMEDIATION & DIGITAL MAPPING RECORD [YEAR 1] (d)				
Survey (Boundary & Grid)	80	acres	\$850	\$68,000
Digital Survey of Anomalies	80	acres	\$2,900	\$232,000
Digital Survey to Reacquire Anomalies	80	acres	\$900	\$72,000
Detonation & Engineering Controls	80	acres	\$525	\$42,000
Excavation / Sifting	11	acres	\$115,000	\$1,265,000
Quality Control	80	acres	\$1,000	\$80,000
Range Residue Removal	80	acres	\$1,100	\$88,000
Analog Removal	80	acres	\$39,800	\$3,184,000
Post-Analog Digital Survey Removal	80	acres	\$10,600	\$848,000
Site Erosion Control / Restoration	80	acres	\$260	\$20,800
Subtotal Costs				\$5,900,000
Reporting	1	lump sum	\$40,000	\$40,000
Subtotal Capital Costs				\$13,981,000
Capital Cost Contingency	10%	of Cost Subtotal		\$1,398,100
TOTAL CAPITAL COST [YEAR 1]				\$15,379,000
ANNUAL COSTS				
PRESCRIBED BURNING, MEC REMEDIATION & DIGITAL MAPPING RECORD [YEARS 2-8]				
Prescribed Burning / MEC Remediation Yearly Cost (from Year 1)	1	lump sum	\$15,379,000	\$15,379,000
Subtotal with Annual Cost Contingency of 5%				\$16,148,000
HABITAT MANAGEMENT [YEARS 2-13] (e)				
Maintain roads / erosion control	1	lump sum	\$37,500	\$37,500
Maintain fuelbreaks	1	lump sum	\$120,000	\$120,000
Invasive weed control in burned areas	1	lump sum	\$233,000	\$233,000
Annual plants monitoring & reporting in burned areas	1	lump sum	\$24,000	\$24,000
Chaparral monitoring & reporting in burned areas	1	lump sum	\$35,500	\$35,500
Subtotal with Annual Cost Contingency of 5%				\$473,000
LAND USE CONTROLS [YEARS 1-30] (f)				
Access restrictions Law Enforcement Ranger	1	lump sum	\$42,000	\$42,000
Maintain perimeter fence & signs	1	lump sum	\$30,000	\$30,000
MEC Recognition & Safety Training	16	week	\$300	\$4,800
Construction Monitoring / UXO-Qualified Personnel Support	260	day	\$2,600	\$676,000
Fire suppression helicopter (post-remediation HCP burns) (Years 20-30)	1	lump sum	\$34,000	\$34,000
Subtotal with Annual Cost Contingency of 5%				\$826,000
TOTAL 30 YEAR NPV ANNUAL COSTS (g)				\$123,032,000
TOTAL REMEDIAL ALTERNATIVE COST				\$138,411,000

Table A-5. Alternative 4 – Technology-Aided Surface MEC Remediation, With Subsurface MEC Remediation in Selected Areas, and Land Use

**Controls Cost Estimate
Track 3 Impact Area MRA Feasibility Study
Former Fort Ord, California**

DEFINITIONS

MEC = Munitions and Explosives of Concern
GIS = Geographical Information System
NPV = Net Present Value

ASSUMPTIONS

These costs are for comparison purposes only, have an accuracy of +50/-30%, and are rounded to the nearest \$1,000.

The following costs are assumed to be addressed under separate programs: (1) Administrative Record management (after submission of documents); (2) Community Relations; (3) Habitat Monitoring and Restoration.

Many design variables and necessary prefield activities have not been established.

Cost estimates will be refined after the field preparation/design is completed.

FOOTNOTES

(a) This alternative assumes a Technology-Aided Surface MEC Removal throughout the Impact Area MRA, and Subsurface MEC Removal on 10% of the Impact Area MRA (on roads, fuel breaks, and other areas). It is assumed prescribed burning (followed by MEC remedial action) would be implemented using a phased approach of conducting prescribed burning and MEC removals of approximately 800 acres of the 6,560-acre Impact Area MRA per year (2 separate mobilizations and burns at 400-acres each, for a period of approximately 8 years). Therefore, a Technology-Aided Surface MEC Removal would be conducted on 800 acres and Subsurface MEC Removal would be conducted on 80 acres (10%) of the Impact Area MRA each year for 8 years. Reporting includes preparation of Annual Site Specific Work Plans and After Action Reports for each phase of prescribed burning and MEC removal.

(b) Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site, and assumes 2 prescribed burns / mobilizations per year. Potential costs associated with community relations and relocation during prescribed burns are not included.

(c) Unit Cost assumptions for Technology-Aided Surface MEC Removal are provided in Table A-3

(d) Unit Cost assumptions for Subsurface MEC Removal are provided in Table A-4. For the entire project for purposes of preparing cost estimates only, assumes approximately 85 acres would require reacquisition of anomalies based on digital mapping and Excavation/Sifting (approximately 11 acres per year for up to 8 years under this alternative).

(e) Annualized Unit Costs for maintaining roads, fuelbreaks, and performing invasive weed control based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for the Impact Area or similar site as follows: [1] Existing roads would be maintained, including erosion control. [2] Existing fuelbreaks would be maintained. [3] Invasive weed control. Costs assumed by Army until 5 years after property transfer (assumed to be 13 years (8 years to complete MEC remedial action and 5 additional years)). Annualized Unit Costs for performing HMP species monitoring are based on recent Fort Ord specific data provided by the Army/USACE and their contractor(s) for the Impact Area or similar site as follows for: [1] HMP annual plants assumed to be monitored during 3 events in the first 5 years & [2] HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data management/evaluation, preparation of reports. Each 800-acre area would be managed in this manner.

(f) Annualized Unit Costs based on recent Fort Ord specific data provided by the Army/USACE and/or their contractor(s) for Impact Area or similar site. Costs assumed by Army, estimated for a total of 30 years under CERCLA FS Cost Guidance (EPA, 1988): [1] Law Enforcement Ranger personnel (assumes one-third of a full time-equivalent of a law enforcement ranger would be employed during reuse of the Impact Area MRA) enforcing access restrictions along the perimeter of the fenced Impact Area MRA. [2] 4-strand barbed wire fence w/concertina wire in some portions & signs would be maintained, and vegetation would be mowed along the fence line. [3] Construction Monitoring / UXO-qualified personnel support assumes full time two-person qualified MEC personnel team visually observing construction activities or providing escort 24 weeks per year. [4] MEC Recognition & Safety Training assumes weekly training and/or refresher training. Costs assumed by Army, assumed to begin after 20 years of vegetation regrowth in approx. 2028; therefore, costs are estimated for 10 years of the total 30 years under CERCLA FS Cost Guidance (EPA, 1988): [5] Type II fire suppress

(g) USACE/EPA provide guidelines in OSWER Directive 9355.0-75 for estimating remedial alternative costs in Circular No. A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, Appendix C, President's Federal Office of Management and Budget (OMB, January 2007) (www.whitehouse.gov). (January 2007; updated yearly). The guidelines for federal projects were applied for estimating the NPV based on annual costs for project durations under 10 years using a rate of return of 2.7%; 10 to 20 years using a rate of 2.8%; 20 to 30 years using a rate of 3%.

Checked: _____ MS

Approved: _____ BLW